SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Lake Henry, Bon Homme County
2102-F-21-R-48
2015

Figure 1. Lake Henry, Bon Homme County

Legal Description: T96-R58-Sec.9-10
Location from nearest town: 1 mile south, 1 mile east of Scotland, SD

Surface Area: 113 acres
Meandered (Y/N): no
OHWM elevation: no data
Outlet elevation: no data
Max. depth at outlet elevation: 37.2 feet
Observed water level: 2' low
Contour map available (Y/N): yes

Watershed area: 34,699 acres
Shoreline length: no data
Date set: NA
Date set: NA
Mean depth at outlet elevation: 13.7 feet
Lake volume: 1,513 acre-feet
Date mapped: 2011

DENR beneficial use classifications: (4) warmwater permanent fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering.

Introduction

General

Lake Henry was created by the construction of a dam across Dawson Creek in 1937. It was named in honor of State Senator Henry Brown of Bon Homme County. The lake quickly became a popular water-based recreation spot for the area. By the late 1980s, however, decades of erosion from the watershed had degraded the lake and use had declined considerably.

Plans to renovate the lake began in 1991 after extensive damage to the spillway was discovered. In 1994, the dam was breached and the lake drained to allow spillway repairs and the removal of accumulated sediments. The renovation project quickly ground to a halt when funding was withdrawn and the lake remained dry for nearly a decade.

In 2002, funding for the project was restored. It was determined more economical to build a new dam rather than rebuild the old one. A new site was chosen ⅜ of a mile downstream and construction began late in 2002. The dam was completed in 2003 and completely filled with water in 2005.

Ownership of Lake and Adjacent Lakeshore Properties

Lake Henry and all surrounding shoreline is owned and managed by the South Dakota Department of Game, Fish and Parks.

Fishing Access

Lake Henry has a two lane boat ramp with a dock located on the southeast corner of the lake near the dam face. There are toilets located near the boat ramp and on the north access area. A handicapped accessible fishing dock is located on the southwest side of the lake. Numerous shore access sites were developed on both sides of the lake and habitat structures were placed to benefit shore anglers. All of Lake Henry has been designated a no-wake zone. At no time may any boat create a visible wake or exceed five miles per hour. This was done to protect the shorelines from erosion and to maintain a quiet, peaceful environment.

Water Quality and Aquatic Vegetation

The water in Lake Henry is typically clear and aquatic vegetation is usually abundant (Table 1).

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Henry, Bon Homme County, 2006-2015.

Year	*Water Temp °C (°F)*	*Secchi Depth cm (in)*	*Observations/Comments (algae, aquatic vegetation, water quality, etc.)*
2015	23 (73)	147 (58)	No vegetation was observed
2014	25 (77)	100 (39)	Small amount of sago pondweed and bulrush
2013	26 (78)	43 (17)	No vegetation observations were recorded
2011	25 (77)	84 (33	Sago pondweed and algae
2009	26 (79)	250 (98)	Sedges and rushes
2007	25 (77)	76 (30)	Sago and rushes

Fish Community

The fish community in Lake Henry is comprised of species normally found in small South Dakota impoundments (Table 2).

Table 2. Fish species commonly found in Lake Henry, Bon Homme County.

Game Species	*Other Species*
Largemouth Bass	White Sucker
Yellow Perch	Common Carp
Channel catfish	
Black Crappie	
Bluegill	
Black Bullhead	
Green sunfish	
Hybrid sunfish	

Fish Management

Lake Henry is managed as a bass/catfish/panfish fishery. Once established after the lake was constructed, the largemouth bass and panfish populations have been self-sustaining. Only some bonus yellow perch and channel catfish have been stocked in the last 10 years (Table 4).

Table 3. Fish kill history for Lake Henry, Bon Homme County.

Year	*Severity*	*Comments*
2010	Light	Some BLC were killed following heavy runoff

Table 4. Stocking history for Lake Henry, Bon Homme County, 2006-2015.

Year	*Number*	*Species*	*Size*
2011	1,747	Yellow Perch	Adult
2012	1,416	Yellow Perch	Adult
	7,875	Yellow Perch	Juvenile
2013	3,300	Channel Catfish	Fingerling

Methods

Lake Henry was sampled on August 17-19, 2015 with 10 overnight trap nets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. Two hours of nighttime electrofishing were done on May 26, 2015 to sample the largemouth bass population.

Results and Discussion

Net Catch Results

Trap net catches in 2015 were similar to 2014 for most abundant species (Tables 5, 9). Bluegill and black crappie were the most abundant species sampled in trap nets this year (Table 5). No yellow perch were sampled in spite of considerable stocking in 2011 and 2012 (Table 4).

Table 5. Total catch from 10 overnight trap nets set in Lake Henry, Bon Homme County, August 17-19, 2015.

Species	*#*	*%*	*CPUE*[1]	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Bluegill	205	53.2	20.5	±7.0	24.1	84	2	90
Black Crappie	172	44.7	17.2	±9.1	19.1	36	0	93
White Sucker	6	1.6	0.6	±0.4	3.2	--	--	--
Channel Catfish	1	0.3	0.1	±0.1	0.1	--	--	--
Common Carp	1	0.3	0.1	±0.1	0.5	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with trap nets in Lake Henry, Bon Homme County, August 17-19, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Bluegill	--	20.5	3.3	16.8	0.4	20.5	±7.0
Black Crappie	0.3	16.9	10.9	6.0	--	17.2	±9.1
White Sucker	--	0.6	--	--	0.6	0.6	±0.4
Channel Catfish	--	0.1	--	0.1	--	0.1	±0.1
Common Carp	--	0.1	--	--	0.1	0.1	±0.1

Length categories can be found in Appendix A.

[1] See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Electrofishing Results

Table 7. Total catch from two hours of electrofishing in Lake Henry, Bon Homme County, May 26, 2015.

Species	*#*	*CPUE*	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Largemouth Bass	70	35.0	±4.3	56.2	78	29	91

Table 8. CPUE by length category for selected species sampled with electrofishing in Lake Henry, Bon Homme County, May 26, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Largemouth Bass	9.5	25.5	5.5	12.5	7.5	35.0	±4.3

Table 9. Trap-net (TN) CPUE for selected fish species sampled in Lake Henry, Bon Homme County, 2006-2015.

Species	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Black Bullhead	210.2		6.5		2.3		1.5		0.7	--
Black Crappie	1.6		28.2		30.8		20.4		16.1	17.2
Bluegill	7.9		28.8		12.0		54.4		21.1	20.5
Channel Catfish	0.5		0.1		--		--		--	0.1
Common Carp	1.4		0.2		0.2		0.4		0.4	0.1
Green Sunfish	1.7		0.4		0.2		0.1		--	--
Hybrid Sunfish	0.5		0.3		0.2		--		--	--
Largemouth Bass	0.2		0.2		--		0.3		0.1	--
White Sucker	4.5		2.7		6.1		1.8		3.5	0.6
Yellow Perch	8.3		0.3		0.2		0.1		--	--

Largemouth Bass

Management Objective

- Maintain a largemouth bass fishery with an electrofishing CPUE of at least 20 and an RSD-P range of 20-40.

Management Strategy

- Stock juvenile largemouth bass in the spring as needed to achieve the management objective.

Largemouth bass are abundant and CPUE has varied little since 2009 (Table 10). Objectives for abundance and size structure have been met since 2013 (Table 10). The population contains fish of all sizes (Figure 3) which indicates relatively consistent natural recruitment. Largemouth bass have not been stocked since 2004 (Table 4).

Table 10. CPUE, PSD, RSD-P, and mean Wr for all largemouth bass sampled with electrofishing in Lake Henry, Bon Homme County, 2006-2015. Columns for stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE		118.5		45.0				36.7	46.0	35.0
PSD		51		28				76	89	78
RSD-P		8		9				41	25	29
Mean Wr		92		96				97	88	91

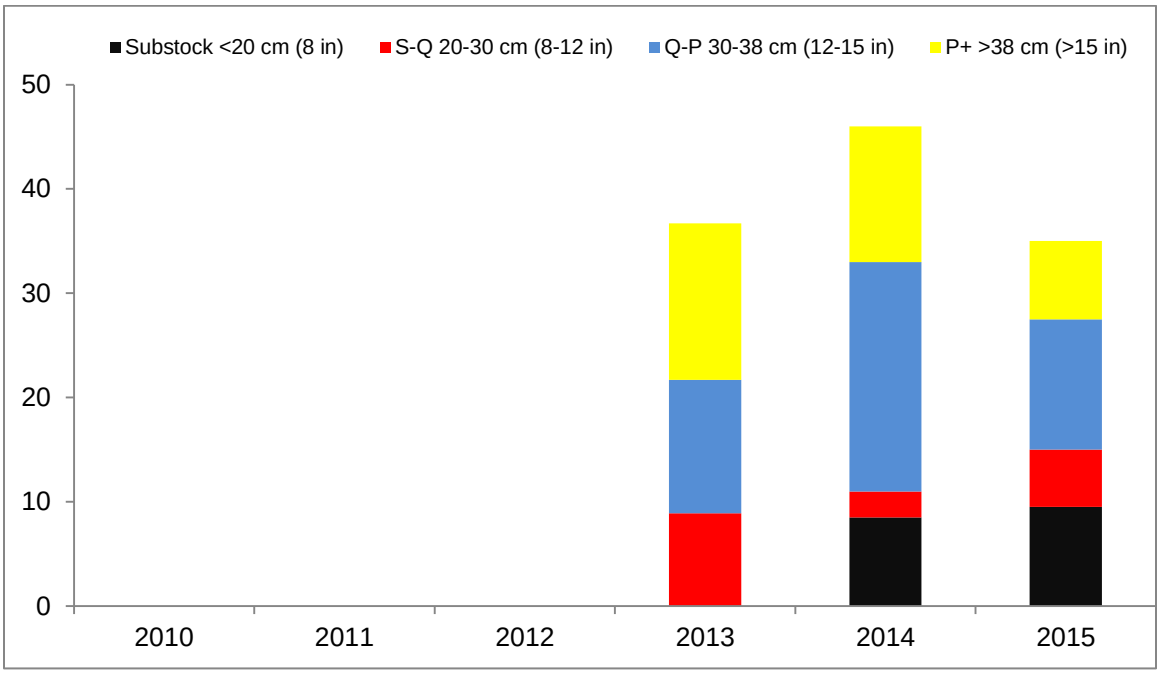

Figure 2. CPUE by length category for largemouth bass sampled by electrofishing in Lake Henry, Bon Homme, County, 2010-2015.

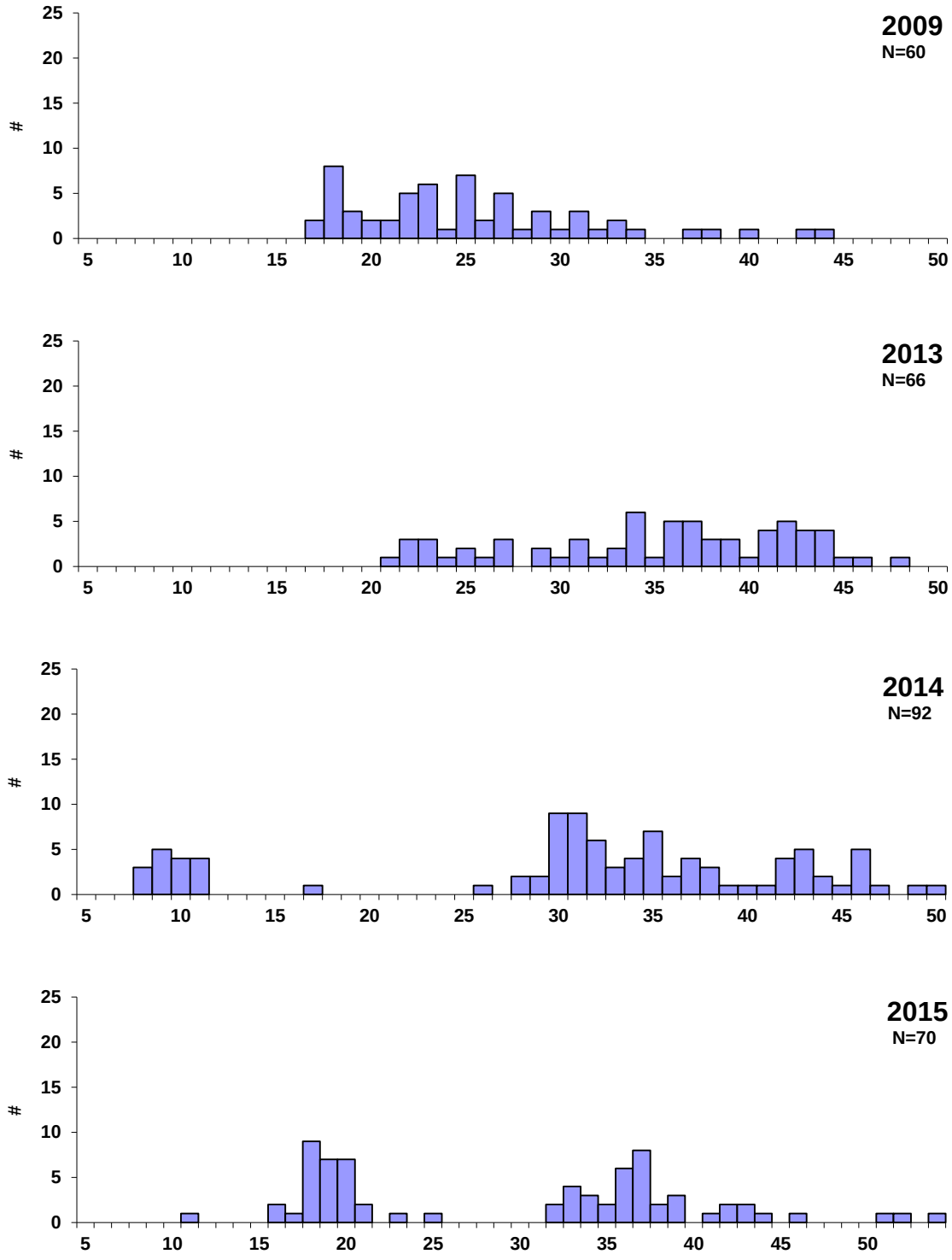

Figure 3. Length frequency histograms for largemouth bass from Lake Henry, Bon Homme County, 2009, 2013, 2014, and 2015.

Bluegill

Management Objective

- Maintain a bluegill fishery with a trap-net CPUE of at least 20 and RSD-18 of at least 20.

Management Strategy

- Monitor the bluegill population during annual lake surveys and report the results.

Bluegill management objectives were met again in 2015 (Table 11). A few Henry bluegills are beginning to exceed 20 cm (8 in)in length and live past age-5 (Table 12). Bluegill growth is close to average for South Dakota small impoundments.

Table 11. CPUE, PSD, RSD-P, and mean Wr for all bluegill sampled with trap nets in Lake Henry, Bon Homme County, 2006-2015. Columns for stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE		28.8		12.0		54.4		21.1	24.6	20.5
PSD		80		88		18		100	90	84
RSD-18		10		53		2		10	41	45
RSD-P		0		3		0		0	0	2
Mean Wr		97		88		93		83	90	90

Table 12. Weighted mean length at capture (mm) for bluegill sampled with trap nets in Lake Henry, Bon Homme County, 2006-2015. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	***Age-1***	***Age-2***	***Age-3***	***Age-4***	***Age-5***	***Age-6***	***Age-7***	***Age-8***	***Age-9***	***Age-10***
2015 (205)	--	152 (75)	159 (18)	184 (42)	187 (66)	212 (4)	--	--	--	--
2014 (246)	108 (20)	145 (4)	163 (9)	176 (199)	180 (14)	--	--	--	--	--
2013 (211)	--	--	169 (179)	180 (32)	--	--	--	--	--	--
2011 (543)	97 (164)	133 (242)	146 (125)	191 (5)	173 (7)	--	--	--	--	--
2009 (117)	--	128 (8)	176 (52)	182 (43)	194 (14)	--	--	--	--	--
2007 (288)	127 (6)	141 (41)	154 (37)	167 (53)	176 (78)	176 (73)	--	--	--	--

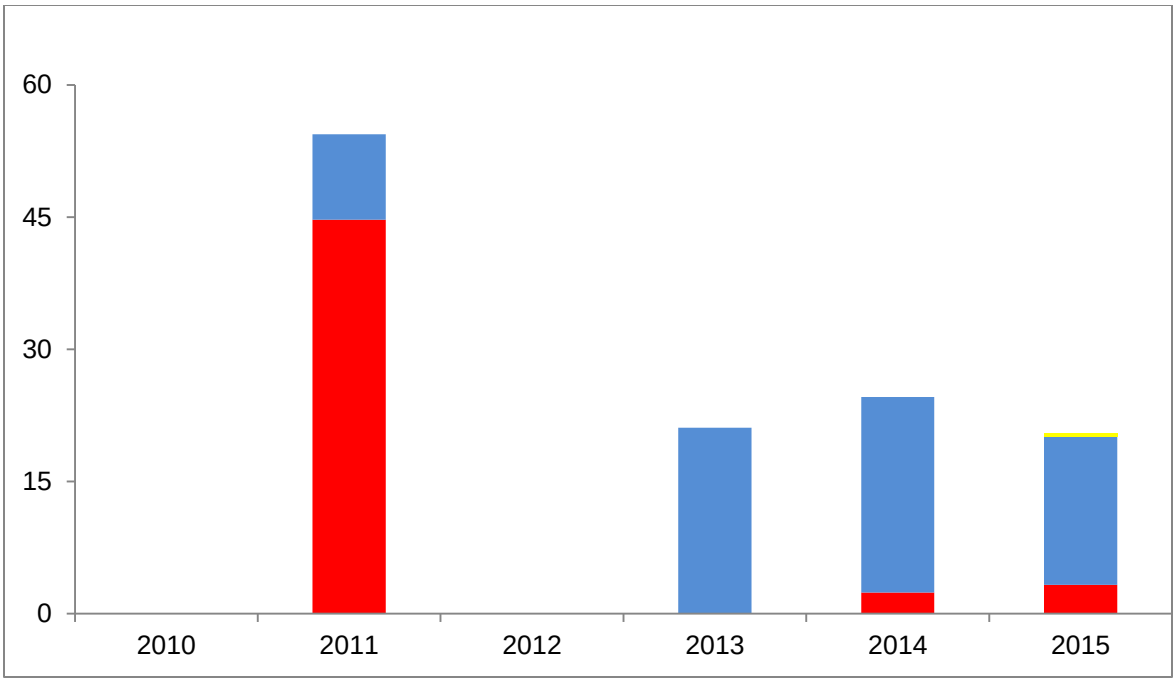

Figure 4. CPUE by length category for bluegill sampled with trap nets in Lake Henry, Bon Homme County, 2010-2015.

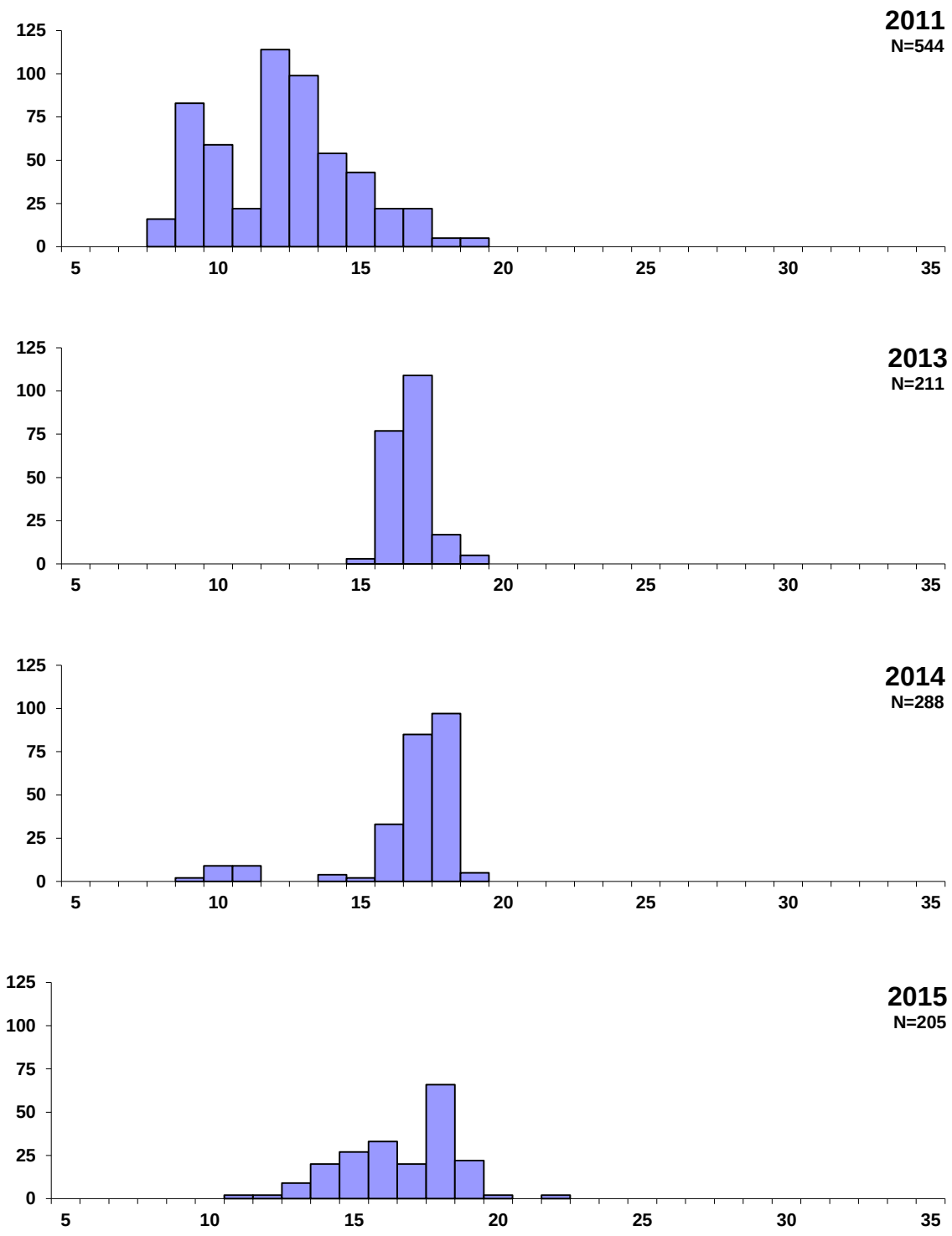

Figure 5. Length frequency histograms of bluegills from Lake Henry, Bon Homme County, 2011, 2013, 2014 and 2015.

Black Crappie

Management Objective

- Maintain a black crappie population with a trap-net CPUE of at least 20 and PSD of at least 40.

Management Strategy

- Monitor the black crappie during annual lake surveys and report the results.

Black crappie CPUE has varied little since 2011 (Table 13). The fish sampled ranged in length from 12 to 24 cm (4.7-9.4 in) (Figures 6 and 7). Growth continues to be better than many of our small impoundments (Table 14). Like bluegill and largemouth bass, black crappies have not been stocked since 2004.

Table 13. CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Lake Henry, Bon Homme County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE		28.2		30.8		20.4		16.1	16.1	17.2
PSD		27		67		6		94	96	36
RSD-23		8		38		3		1	17	21
RSD-P		4		2		0		0	0	0
Mean Wr		100		96		96		85	90	93

Table 14. Weighted mean length at capture (mm) for black crappie sampled with trap nets in Lake Henry, Bon Homme County, 2006-2015. Note: sampling was conducted at approximately the same time during each year allowing comparisons among years to monitor growth trends. Sample size is in parentheses.

Year	***Age-1***	***Age-2***	***Age-3***	***Age-4***	***Age-5***	***Age-6***	***Age-7***	***Age-8***	***Age-9***	***Age-10***
2015 (172)	132 (12)	192 (113)	--	227 (13)	236 (34)	--	--	--	--	--
2014 (161)	138 (8)	--	230 (10)	221 (143)	--	--	--	--	--	--
2013 (161)	--	--	204 (56)	214 (105)	--	--	--	--	--	--
2011 (204)	146 (193)	226 (9)	245 (2)	--	--	--	--	--	--	--
2009 (308)	149 (89)	195 (73)	236 (126)	239 (20)	--	--	--	--	--	--
2007 (279)	151 (120)	180 (112)	225 (38)	254 (7)	--	285 (2)	--	--	--	--

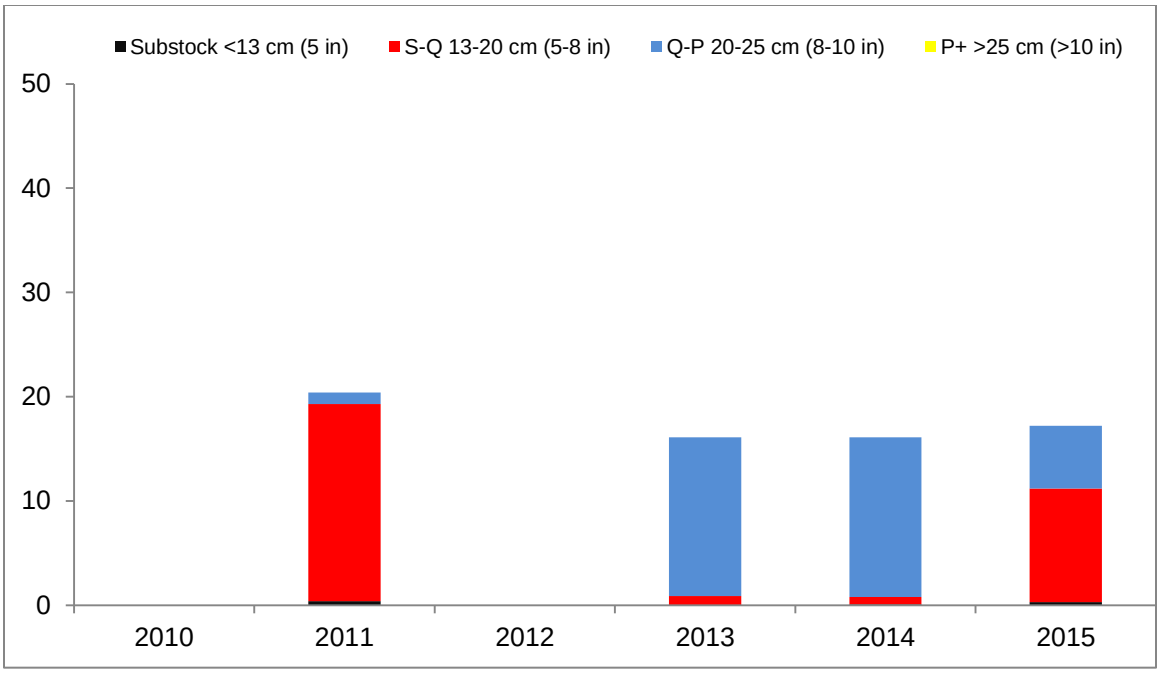

Figure 6. CPUE by length category for black crappie, sampled with trap nets in Lake Henry, Bon Homme County, 2010-2015.

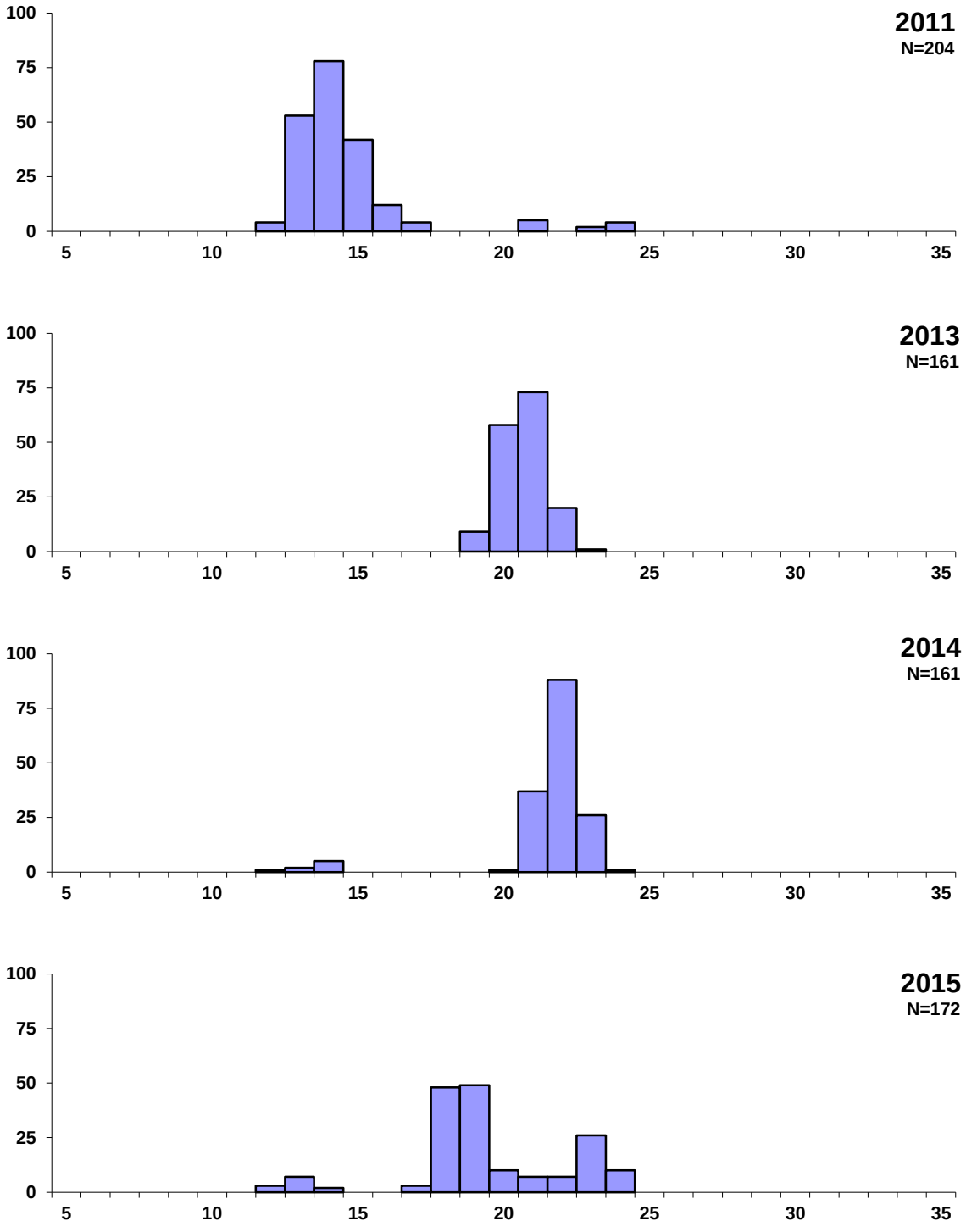

Figure 7. Length frequency histograms of black crappies from Lake Henry, Bon Homme County, 2011, 2013, 2014 and 2015.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (Inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.